What is claimed is:

Sub A1

1. In a data handling system which uses an actuator arm to support a head adjacent a recording surface and a servo loop to controllably move the actuator arm, a method for canceling an actuator arm oscillation induced by a resonance mode excitation of the actuator arm, comprising steps of:
   (a) identifying a frequency of actuator arm oscillation induced by the resonance mode excitation;
   (b) initiating a seek to move the head from an initial track to a destination track on the recording surface;
   (c) receiving a position error signal indicative of a position of the head relative to the recording surface;
   (d) generating a compensation signal based on the position error signal and the frequency of the actuator arm oscillation and adapted to remove a component of the position error signal arising from the actuator arm oscillation; and
   (e) applying the compensation signal to the servo loop as the head is settled onto the destination track.

2. The method of claim 1, wherein the identifying step (a) comprises steps of abruptly accelerating and decelerating the actuator arm to subject the actuator arm to a broad spectrum excitation, and measuring the actuator arm oscillation resulting from the excitation.

3. The method of claim 1, further comprising a step of entering a track following mode to cause the head to remain over the destination track while removing the compensation signal from the servo loop.

4. The method of claim 1, wherein the applying step (e) produces a notch in an error sensitivity function relating the position error signal to an actuator arm oscillatory disturbance.

5. The method of claim 4, wherein the compensation signal is generated in accordance with the following relation:

$$A(z) = \frac{u_{ff}}{PES} = \frac{z^2[\frac{\mu_0}{\alpha}\cos(\varphi)] - z[\frac{\mu_0}{\alpha}\cos(\varphi + \omega_0 T)]}{\frac{z^2}{\eta} - z[2\cos(\omega_0 T)] + \eta}$$

where u_{ff} is the compensation signal, PES is the position error signal, z is a z transform function, ω_0 is a nominal frequency of the notch, η controls a nominal depth of the notch, μ_0 controls a nominal width of the notch, α is a gain parameter indicative of a closed loop gain of the servo loop at ω_0, φ is a phase parameter indicative of a phase response of the servo loop at ω_0, and T is a sampling period.

6. A data handling system, comprising:

a recording surface on which a plurality of nominally concentric tracks are defined;

an actuator assembly comprising an actuator arm which supports a head adjacent the recording surface; and

a servo circuit coupled to the actuator assembly, comprising:

a servo controller which controls position of the head in response to a position error signal indicative of a position of the head with respect to the recording surface, the servo controller configured to perform a seek operation to move the head from an initial track to a destination track; and

a filter operably coupled in parallel with the servo controller to receive the position error signal and to generate a compensation signal during a settle mode as the head is brought over the destination track, the compensation signal based on the position error signal and a frequency of actuator arm oscillation induced by resonance mode excitation during the seek, the compensation signal adapted to cancel a component of the position error signal arising from the oscillation.

7. The data handling system of claim 6, wherein the servo circuit further comprises:

a demodulator which generates the position error signal in response to servo data transduced by the head from the recording surface; and

a motor driver which applies a current to an actuator motor to move the actuator arm, wherein the servo controller generates a current command signal which is combined with the compensation signal to generate a modified current command signal which is used by the motor driver to apply current to the actuator motor.

8. The data handling system of claim 6, wherein the servo circuit determines the frequency of oscillation by abruptly accelerating and decelerating the actuator arm to subject the actuator arm to a broad spectrum excitation, and measuring the actuator arm oscillation resulting from the excitation.

9. The data handling system of claim 6, wherein the filter comprises a second order, linear time-invariant filter with a trigonometric function based transfer function.

10. The data handling system of claim 6, wherein the actuator assembly comprises a plurality of actuator arms each supporting at least one head, and wherein the filter is configured to independently compensate oscillation of each arm.

11. A data handling system, comprising:

an actuator assembly comprising an actuator arm which supports a head adjacent tracks defined on a recording surface; and

means for identifying a frequency of actuator arm oscillation induced by resonance mode excitation during a seek operation wherein the head is moved from an initial track to a destination track, and for thereafter canceling a component of the oscillation during a settle mode during which the head is brought adjacent a selected track.

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